SITE SPECIFIC PROJECT PLAN FOR:

Nash Stream Restoration Project – R-06-CT-05

Operated Under:
Generic QAPP for Stream Morphology Data Collection, dated June 17, 2003

Final Draft
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1. Distribution List

Table 1 lists people who will receive copies of the approved Site Specific Project Plan (SSPP) under the *Generic Quality Assurance Project Plan for Stream Morphology Data Collection* dated June 17, 2003.

Table 1. SSPP Distribution List

SSPP Recipient Name	Project Role	Organization	Telephone number and e-mail address
John Field	Technical Project Manager	Field Geology Services	207-491-9541 jfield@field-geology.com
James MacCartney	Project Manager	Trout Unlimited	603-226-3436 jmaccartney@tu.org
Eric Williams	Program Manager	NHDES, Watershed Management Bureau	603-271-2358 ewilliams@des.state.nh.us eric.williams@des.nh.gov
Jillian McCarthy	Program QA Coordinator	NHDES, Watershed Management Bureau	603-271-8475 jmccarthy@des.state.nh.us jillian.mccarthy@des.nh.gov
Vince Perelli	NHDES QA Manager	NHDES, Planning, Prevention & Assistance Unit	603-271-8989 vperelli@des.state.nh.us Vincent.perelli@des.nh.gov

2. Project Task Organization

Figure 1 outlines the organization structure of the project personnel.

Figure 1. Project Organizational Chart

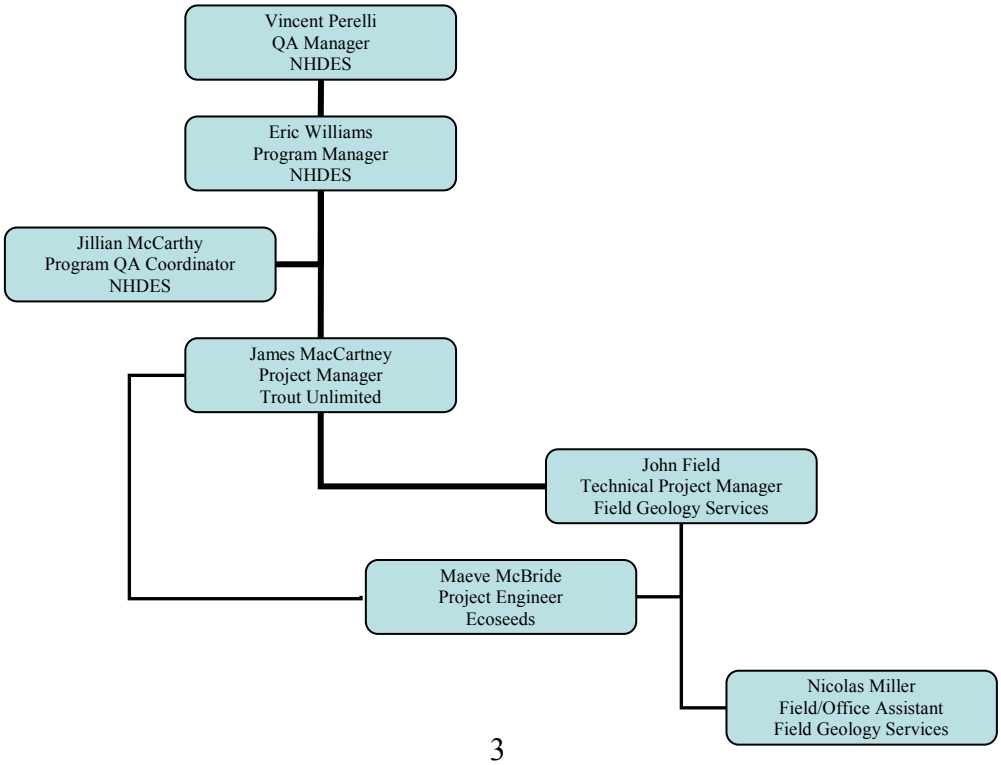

Table 2 identifies the roles and responsibilities of those individuals involved in the project.

Table 2. Personnel Responsibilities and Qualifications

Name and Affiliation	Responsibilities	Qualifications
James MacCartney, TU	Project Manager	Trained in data management and experienced project manager
John Field, Field Geology Services	Technical Project Manager Project QA/QC Officer	Trained in stream morphology data collection, analysis, interpretation, and stream survey techniques
Jillian McCarthy, NHDES, Watershed Management Bureau	Reviews QAPP preparation and other QA/QC activities	On file at NHDES
Eric Williams, NHDES, Watershed Management Bureau	Reviews and oversees projects funded by DES 319 Restoration Grants in Connecticut, Saco, and Androscoggin watersheds.	On file at NHDES
Vince Perelli, NHDES Planning, Prevention & Assistance Unit	Reviews and approves QAPPs	On file at NHDES

3. Site Information

This project involves mapping and surveying of bank and channel conditions on Nash Stream to identify causes for channel instability and habitat degradation and opportunities for future restoration. It also entails assessment of stream crossings on tributaries to Nash Stream to evaluate the degree of flow regime alteration from hydrostructure flow regulation/modification and to determine whether the surface waters support an integrated community of organisms comparable to that of similar natural habitats in the region. Among other things, the stream crossing assessment will consider whether the height of culvert perch exceeds the jump capacity of resident, native fish species.

A large dam break flood in 1969 and subsequent channel straightening resulted in overwidened and shallow channels, coarse channel substrate, and poor cover habitat for native fish species. Post-flood replacement/repair of stream crossings resulted in perched, undersized, and/or poorly aligned crossing structures that reduced or blocked access to important tributary habitat, degraded channel stability, and created risk of future crossing failures.

Efforts to reduce flow velocities and increase channel roughness with the addition of wood and boulders to the channel will increase channel complexity and improve aquatic habitat. The mapping and surveying of bank and channel conditions will identify opportunities for restoring channel stability that will improve aquatic habitat not only at the restoration site but to adjacent reaches as well. The assessment of stream crossings will identify and prioritize opportunities to improve channel stability and aquatic organism passage, and suggest ways to ameliorate hydrostructure flow regulation/modification at crossing locations. Remediation of crossings will reduce the risk of crossing failures, and reconnect aquatic habitat so that surface waters support an integrated community of organisms.

4. Project Rationale

A. Problem Definition

The purpose of this project is threefold: 1) document the causes for channel instability and aquatic habitat degradation along Nash Stream and its tributaries, 2) document the condition of stream crossings on tributaries to Nash Stream, and 3) identify restoration opportunities that will decrease flow velocities, increase channel and floodplain complexity, remove barriers to aquatic organism passage, support an integrated community of organisms, improve channel stability at crossing locations, and improve aquatic and riparian habitat.

The *Fluvial Geomorphology Assessment of Northern Connecticut Tributaries* completed in January 2006 identified sediment inputs from Nash Stream as a cause for significant channel adjustments on the Upper Ammonoosuc River. The 2005 assessment report is on file at the New Hampshire Department of Environmental Services. Consequently, restoration efforts on Nash Stream have the potential to positively impact the Upper Ammonoosuc River as well. The large dam break flood in 1969 on Nash Stream created large boulder bars along Nash Stream that continue to confine floodwaters and slow the reestablishment of riparian vegetation. The flood also destabilized high banks of glacial deposits that are still unstable in many places and contributing high sediment loads to the channel. The high sediment loads and flow confinement are primary contributors to the degraded aquatic habitat along Nash Stream.

B. Historical Data

Previous longitudinal profile and cross section data collected for initial fish habitat assessments will be used as baseline data for project monitoring on Nash Stream. Additional cross sections are to be surveyed as part of the Nash Stream Restoration Project. The earlier surveys were completed following the same procedures outlined in the *Generic Quality Assurance Project Plan for Stream Morphology Data Collection* dated June 17, 2003. Historical aerial photographs already available at Trout Unlimited will be used to identify changes in channel position and human land use during the past 50 years on Nash Stream and to assess the morphological impact of the 1969 dam break flood. Additional channel changes back to 1930 will be assessed using historical topographical maps available on-line at http://docs.unh.edu/nhtopos/nhtopos.htm.

5. Project Description and Schedule

The feasibility of restoring channel stability and aquatic habitat on Nash Stream will be assessed by mapping bank composition, stability, and height along with surveys of channel dimensions and gradients following the same procedures outlined in the *Generic Quality Assurance Project Plan for Stream Morphology Data Collection* dated June 17, 2003. The results of the mapping and surveying will be used to identify the highest priority sites where restoration will not only improve stability and aquatic habitat at the given site but will lead to positive improvements elsewhere along the channel. Several restoration alternatives will be considered for each site with concerns about access, nearby infrastructure, and costs factoring into final decisions about the preferred restoration options. While the reactivation of side channels at a particular site might provide the greatest improvement to channel stability and aquatic habitat such an option might not be feasible if the side channel under consideration is running along side a road. In

such a circumstance, the addition of wood and boulders to the main channel might also provide improvements to channel stability and habitat while leaving the road less threatened. Dr. John Field will complete the alternatives analysis and develop the conceptual designs for the various restoration options at a variety of potential restoration sites. The success of future restoration projects will be determined by monitoring the site over a three year period following implementation. Three cross sections will be surveyed at the site immediately following project construction and compared with cross sections taken in the same location during the 2007 assessment to be completed as part of this project. This will provide information on channel dimensions before and after project implementation. The cross sections will be resurveyed the first and second year after project implementation to determine if the amount of sediment storage on Nash Stream has increased. Ground photographs will also be taken to provide visual documentation of the project and changes that occur for a two year period after its completion. The NHDES SOP for photo documentation, to be used for this project, is on file on the NHDES Watershed Management Bureau network drive (H Drive). These monitoring techniques will be the best to use for this project as it will provide both quantitative and visual evidence of changes (or lack of changes) occurring along Nash Stream after project implementation. For the project tasks schedule, refer to the *2006 Watershed Restoration Grant Proposal for Nash Stream Restoration Project* on file at NHDES. The current proposal will assess only the feasibility of proposed restoration options with implementation scheduled for 2008 or 2009.

The need and feasibility of remediating stream crossings on tributaries to Nash Stream will be assessed by measuring and recording information about the existing structure, photographing the structure and up/downstream reaches, and surveying channel dimensions and gradients within the structure and at up/downstream reaches following the procedures outlined in the *National Inventory and Assessment Procedure for Identifying Barriers to Aquatic Organism Passage at Road-Stream Crossings* (USFS San Dimas Technology and Development Center, 2003) http://www.stream.fs.fed.us/publications/PDFs/NIAP.pdf. The results of the assessment will be used to analyze fish passage at the stream crossings and to prioritize crossings where restoration will improve channel stability and form, eliminate habitat fragmentation, and support an integrated aquatic community. Fish passage will be analyzed using *Evaluation of a Predictive Model for Upstream Fish Passage Through Culverts* (Joseph Seth Coffman, Graduate Thesis, James Madison University, May 2005) http://www.fs.fed.us/biology/resources/pubs/feu/thesis_coffman_fishpass_2005.pdf. The thesis contains data specific to the same and similar fish species that are native to the Nash Stream Watershed.

6. Final Products and Reporting

The estimated completion dates of the following tasks, products, and reporting is available in the final Section 319 Watershed Assistance Grants project proposal, on file with the NHDES Watershed Assistance Section.

The final products for this project include the following:

1 Survey data of existing morphological conditions on Nash Stream
2 Maps of bank and channel conditions on Nash Stream

3 Table of restoration options with prioritization of sites based on expected improvements to channel stability and aquatic habitat
4 Survey data of existing conditions at stream crossings on tributaries to Nash Stream
5 Table comparing the height of existing culvert perch with the jump capacity of resident, native fish species
6 Table comparing the width of existing crossings with bankfull channel widths located up and/or downstream, outside the influence of the crossing structure
7 Final report with drafted cross sections, longitudinal profiles, and substrate particle size analysis on Nash Stream, and compilation of stream crossing data
8 Semi-annual progress reports

All products will be submitted by John Field, in both electronic and paper copies, to the NHDES Watershed Assistance Section for review and approval.

The final report will include a description of the environmental results and the measures of performance for this project: improvements to channel stability; improvements to aquatic habitat; increases in channel complexity, improvements to channel stability at stream crossings, and increases in habitat connectivity and integration of the aquatic community. Although implementation other than culvert remediation will occur as part of a future project, cross-sections surveyed as part of this study will be monumented for future monitoring. Ground photographs will be taken to provide the basis for "before and after" photographs to document vegetation growth on bars and banks, improvements in channel sinuosity, and increases in woody material in the channel. The NHDES SOP for photo documentation, to be used for this project, is on file at NHDES on the NHDES Watershed Management Bureau network drive (H Drive). . The cross sectional and longitudinal profile data will also be used to calculate sediment transport capacity during a bankfull event. This data will be used to compare with transport capacity after restoration is complete.